



# **Materials Sciences Division Safety Committee Meeting**

**March 22, 2011**

*Materials Sciences Division – March 22, 2011*

# Opening Remarks



- Miquel Salmeron, MSD Director
- Jeff Neaton, MSD Deputy Director for Science

# Agenda



- **MSD Safety Committee – Membership & Liaisons**
- **Executive Safety Committee**
- **Issues from the field**
  - Gas cylinder disposal
  - E-waste management
- **Gas cylinder cleanout**
- **Injuries and Incidents**
- **Near Misses**
- **Follow-up from Old Injury**
- **MSD ISM Review**
- **LBNL Cultural Perception Survey**

# MSD Safety Committee Membership & Liaisons



## Chair and Deputy Chair:

Rick Kelly, Joel Ager

## Building Managers:

Gilbert Torres (62, 66, 67), John Turner (72),

Oliver Gessler (2, shared with Gil Torres)

## MSD EHS Administrative Support:

Susan Waters

## Electrical Safety Repairs:

Jim Severns (MSD)

## MSD EH&S Technician:

Paul Johnson

Carleton Falzone

## SAC Representative

Erik Anderson

## Liaisons:

### EH&S Liaison to MSD:

Larry Mcclouth

### Waste Generator Assistant Liaison:

Howard Hansen (EHS)

### Laser Safety Officer

Ken Barat

Each LBNL-based research group in MSD, including each program in the Molecular Foundry, will designate a primary and backup representative to serve on the Safety Committee

Research Group (bill)	Reps
Ager	Ether Alarcon Llado
Blackwell	Robert Sulc
Bourret	Edith Bourret
CXRO	Ron Tackaberry
DeJonghe	Nana Zhao
Dubon	Joseph Wofford
Dynes	Steve Wu
Fadley	Alexander Gray
Foundry User Program	David Bunzow
Foundry/Milliron	Tracy Mattox/ Tev K.
Foundry/Zuckermann	Michael Connolly
Foundry/Cabrini	Bruce Harteneck
Foundry/Svec	Biwu Ma
Foundry/Neaton	David Prendergast
Foundry/Ogletree	Paul Ashby
Haller/EMAT	Jeff Beeman
Javey	Kunihara Takei
JCAP	TBD
Jerome	TBD
Kaindl	Yiming Xu/He Wang
Lanzara	Sebastien Lounis
Liliental-Weber	Zuzanna Liliental
NCEM	Doreen Ah Tye
Orenstein	James Hinton
Ritchie	Joseph Lemberg
Salmeron	Xiaofeng Feng
Schoenlein	Yi Zhu
Somorjai	L. Robert Baker
Tomsia	Tony Tomsia
MSD Business Office	Sandra McFarland
Zhang	Sui Yang

# New MSD Executive Safety Committee



- **Purpose:** To review information and data pertaining to the safety program in MSD and to make recommendations to Division Management for improvements and areas of emphasis.
- **Membership:**
  - Li Yiu, Foundry
  - Weilun Chao, CXRO
  - John Turner, NCEM
  - Rick Kelly
  - Sandra McFarland
  - Jeff Neaton
  - Miquel Salmeron
- **First Topics:**
  - Review findings from external “ISM Review of MSD”
  - Roll out of consistent “work lead” approach
  - Review findings from LBNL/MSD “Safety Culture Survey”

# Issues From the Field: **Jeff Beeman**



- **Getting rid of old cylinders: Non-returnable bottles?**
- **E-waste management: More efficient procedures?**

# Gas Cage Cleanout: **Gil Torres**



## Bldg 2-62 Gas Cage Etiquette

1. This gas cage is not a long-term storage area!
2. If cylinders are not picked up within  $\sim 2$  weeks, they will be returned to the gas vendor. You will NOT be notified before this happens.
3. Please don't order more than you need!

If you need to store cylinders for a longer term due to construction or lab renovation, contact building Manager to arrange for storage.



# Review of Injuries and Incidents



# Summary of Chemical Splashes

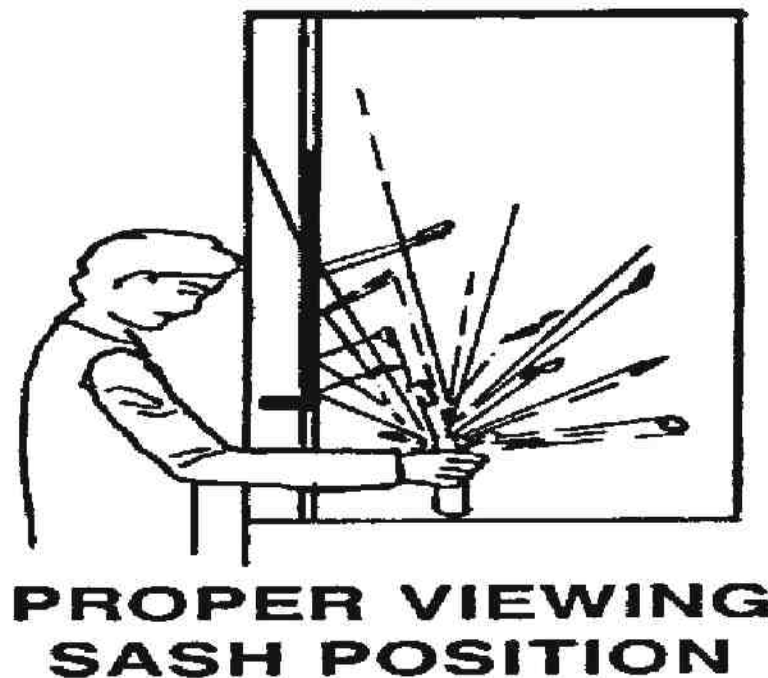


1. During synthesis of nanoparticles, vacuum stopper implodes, spraying undergraduate in face with corrosive organic materials (Foundry)
2. Container of KI falls out of cabinet and splashes graduate student, who had removed his lab coat prematurely (Foundry)
3. Undergraduate loses control of pressure in separatory funnel, sprayed with corrosive and toxic materials (Foundry)
4. **NEW:** A glass vial used for sonication of small parts bursts, spraying Post doc in the face with dilute acid (Foundry)
5. **NEW:** Syringe filter pops off, spraying post doc in the face with flammable material and dilute acid (Campus lab)

# Chemical Splashes: Consistent Problem



- Not using fume hood sash to maximum benefit as a shield
- Not wearing faceshields
- **Have to do one-or-the-other when working with corrosive or toxic materials when there could be a splash!**
- **Must consider co-located operations, not just your own**



# High Pressure Needle Stick



- User attached a tube and syringe/needle to house nitrogen
- When she opened the valve, the syringe popped off the tubing, flew through the air and stabbed her hand
- **Root Cause: Gas pressure to this fume hood too high (100 psig)**
- Foundry was built without local pressure regulation, and pressure to building is kept at about 100 psig to support instruments that use this gas pressure
- Almost all rooms were retrofitted years ago with regulators either at the room entrance or at the hoods, several rooms on the 6th floor were somehow skipped
- Being fixed now
- **Please check your gas outlets**



# Delayed Reporting of Cut Injury



- **Cut finger on edge of metal laser box**
- **Happened after hours, tried to get medical attention, had to go to Kaiser for stitches**
- **Forgot to report it to Division or Health Services, the Division and EHS found out much later**

# Other Injuries



- **Ongoing ergonomic injury associated with computer use**
  - Further accommodations provided to help employee recover
- **Employee tripped on surveying marker in sidewalk**
- **Aforementioned chemical splashes**



# Near Misses

# Near Miss: Trapped in Cold Room



- Person from EH&S Division trapped in 6th Floor Foundry cold room: No phone, fortunately somebody was around to let her out
- Has an emergency alarm button, but not labeled
- Results from improper design of ventilation controller
- Recognized in 2006 but never fixed
- Interim instructions for getting out are now posted
- Being fixed permanently now





## Near Miss: More Unsafe Equipment: **Jim Severns**



*A Superstore for Material Researchers & Engineers*  
*A World Leader in advanced Material & Laboratory Equipments*  
Order Hotline: **1-888-525-3070**



- Recently purchased an induction heater from MTI Corp:
  - Not NRTL approved
  - Very cheaply made
  - Too unsafe to use, must be repaired at significant cost or disposed of (too late to return)
  - \$8500 potentially lost
- Unsafe is the norm for MTI
- **Do not order from MTI without talking to Rick first**
- **Uninspected MTI equipment with Bourret and Javey labs**





# Near Miss: Toxic Gas Alarm Bypass in Foundry



## **Investigation & Analysis Report for the Occurrence Reporting and Processing System Toxic Gas Detector Low Alarm Mis-wired Incident on December 3, 2010**

- Part of alarm system to fire department had been bypassed, probably during maintenance
- Main function of TGMS was still intact, no risk to personnel
- Mostly due to inadequate procedures for maintenance and retesting of alarm system after maintenance
- Note: B 2-137 alarm system must be tied to the Fire Department

## Near Miss: Guest PIs Student III Informed



During a lab inspection by EH&SD, a student was found in a SEM facility with a sample in a biohazard bag that she intended to put into the SEM.

- She did not know who her host was and did not have a JHA
- Turns out that she was a student of a guest from UCSF, she had been briefed on safety requirements for the SEM, the sample was not biohazardous. She was apparently just clueless.
- Upon questioning, the PI indicated that there was no review process for samples to be put into the microscope--this is a problem.
- This problem is Division-wide and was identified by the recent ISM review as a weakness

## Near Miss: Lab personnel adjust fume hood flow controller: **Larry McLouth**



- Multiple instances where lab personnel had adjusted the set or alarm points for the fume hood flow monitors
- If you have a problem, let Paul Johnson or Carleton Falzone know and they can evaluate your issue or get the controller or ventilation repaired
- Nobody in the Division is authorized to change the set points
- New Labels will be placed near controllers to warn personnel about changing them





# Other Issues

# Addressing Problem from Older Injury



- Injury resulting from moving a heavy piece of equipment that had been incorrectly placed in front of the building electrical panels
- Panels were not marked to indicate that they should not be blocked
- Purchased labels, installed them in most locations throughout MSD at LBNL
- Contact Paul or Carleton if you find unmarked cabinets or disconnects



# Use of CMS is Inadequate Outside of the Foundry:

## Paul Johnson



**Container Search**

ERNEST ORLANDO LAWRENCE BERKELEY NATIONAL LABORATORY

You can use either a partial or full word Search in any of the fields below. The searches are NOT case sensitive.

**Container Search**

☒ Basic Search ☐ Advanced Search

Barcode:  Example: CH123456

Name:  Example: ACETONE

☐ begins with ☐ exact match ☒ contains

☐ include synonyms

Name:  Example: Smith

Name:  Example: Smith

Building:  All

Room:  All

Division:  Include All Divisions

Container Division:  Materials Sciences

Results per page:  30

Production Server

Role: SUPERUSER  
Permissions: READ-WRITE  
Access Level: UNIVERSAL

- Chemicals must be bar-coded **AND** recorded in the CMS database

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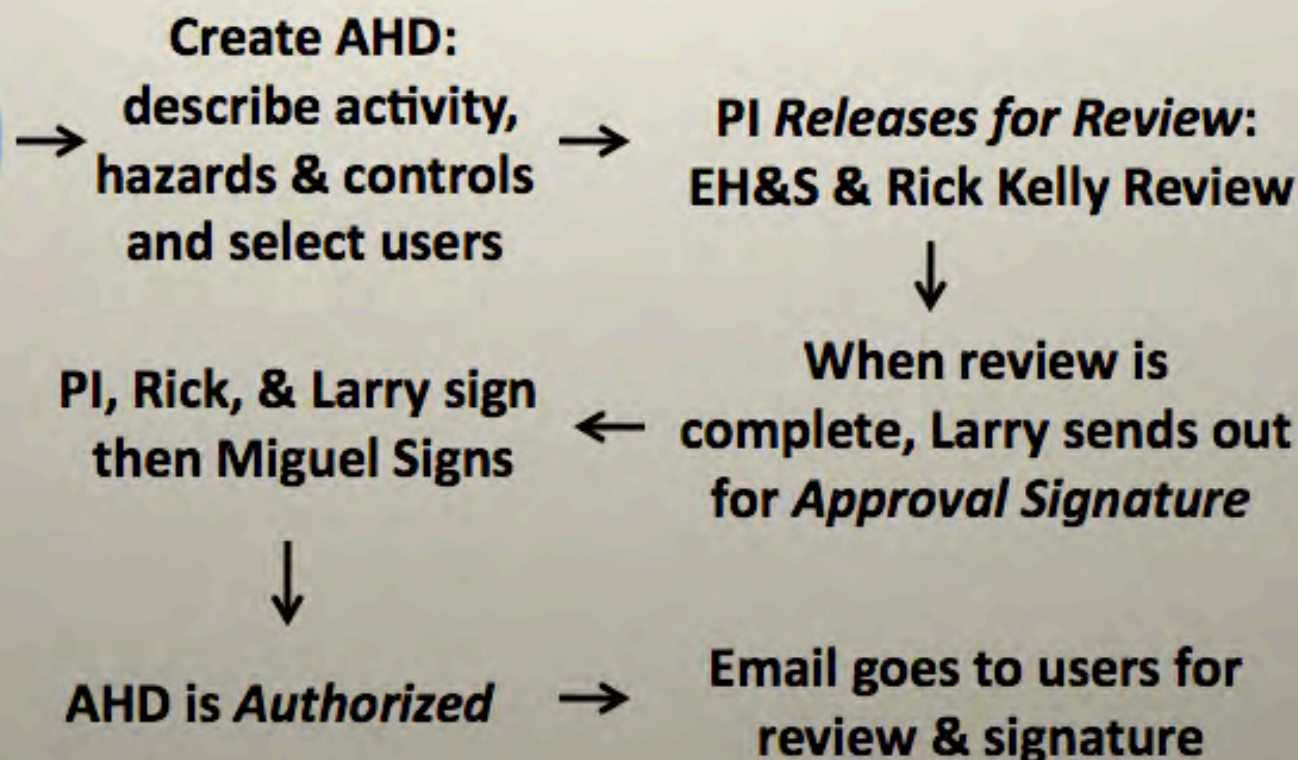


# Activity Hazard Document (AHD) User Sign Off

## Larry McLouth – EHS Liaison with MSD



### Background: AHD Process



# AHD User Sign Off



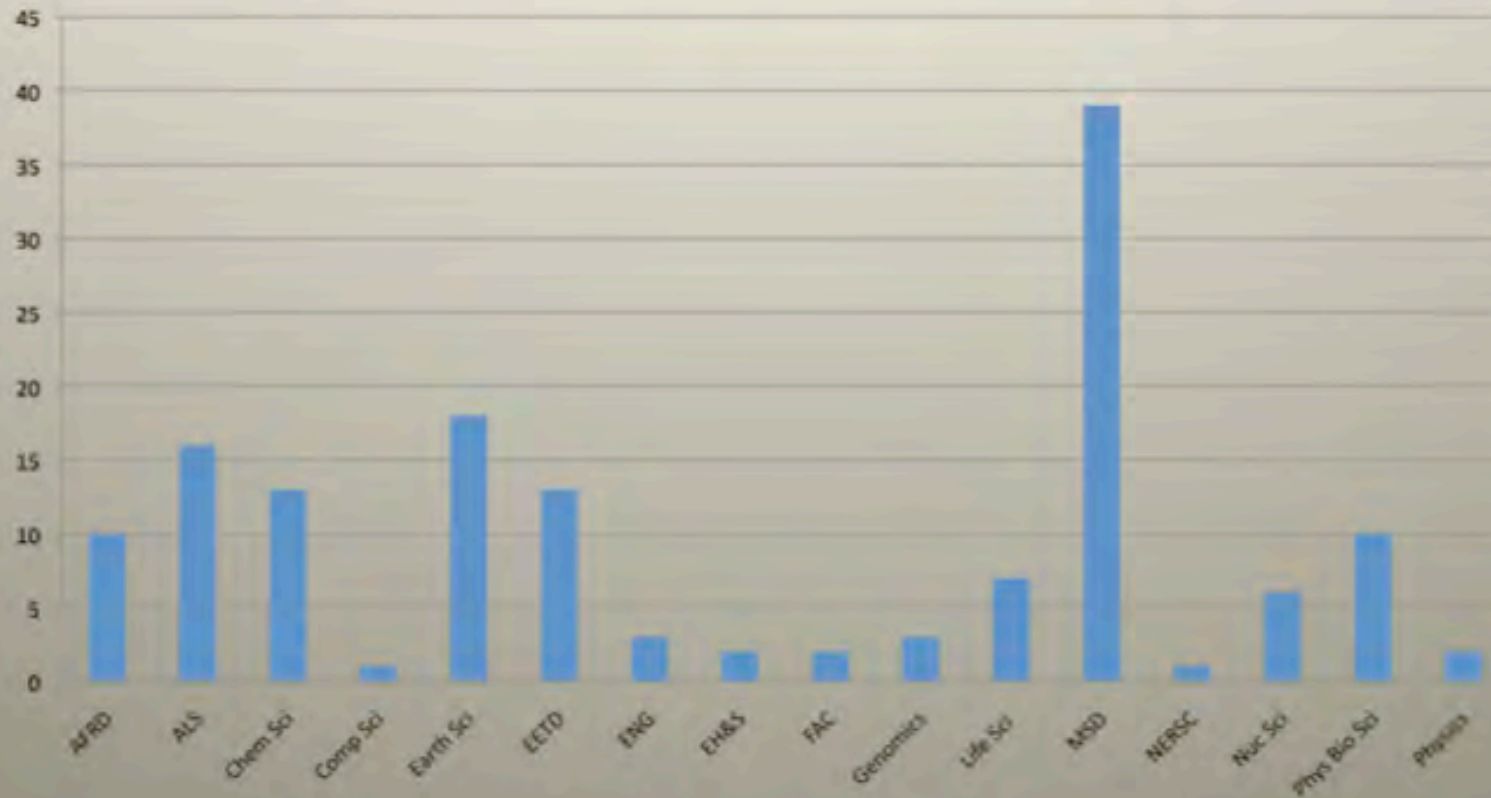
- A user is *authorized* to participate in the AHD when he/she reviews & signs it
- Signature acknowledges the user understands hazards & controls and will follow AHD requirements
- Lack of user sign off  $\neq$  non compliance
- It means that you can't participate in that activity



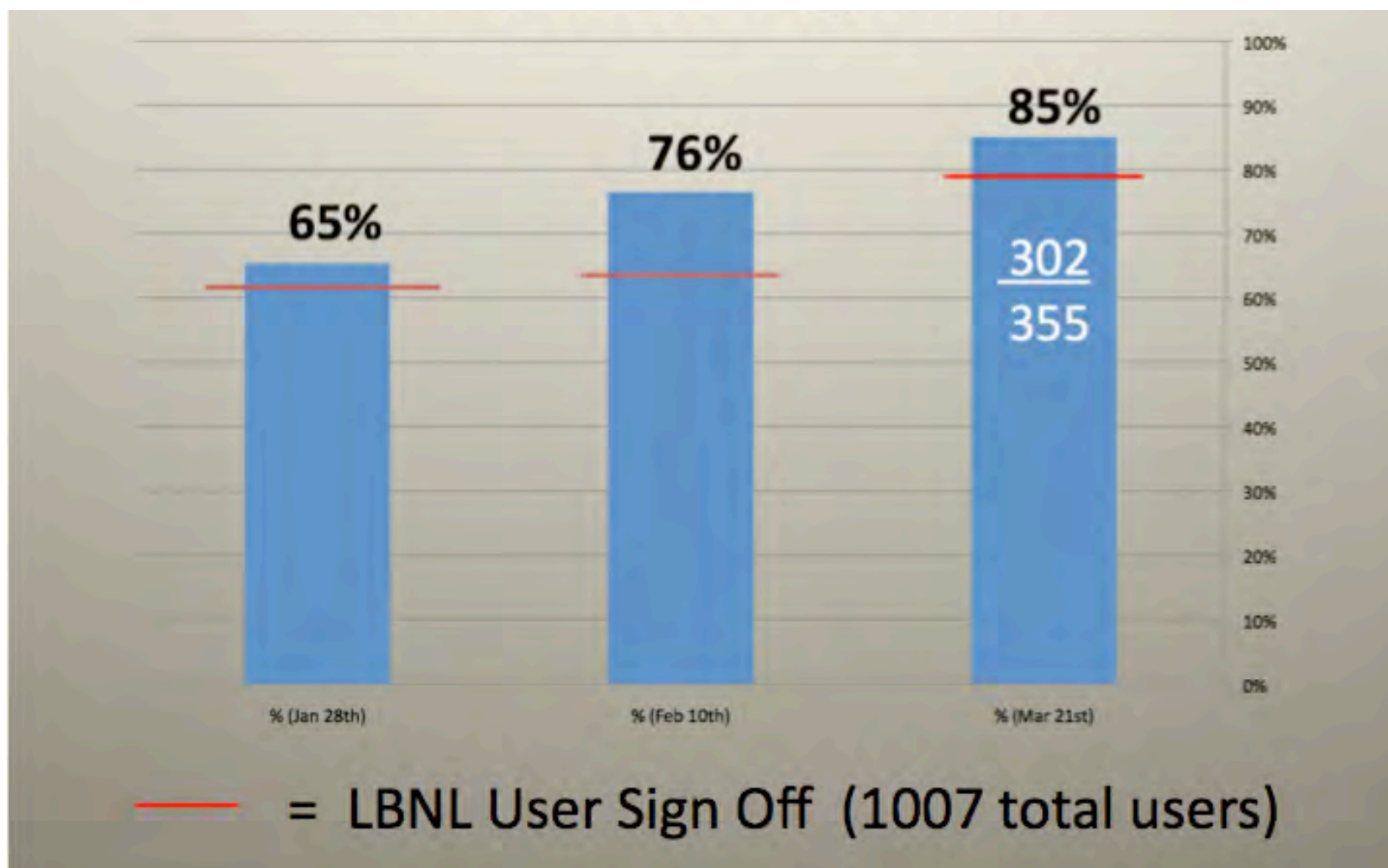
# AHD Distribution at LBNL



146 Total      MSD Has 39 (27%)



# MSD User Sign Off



# AHD Sign Off



## Path Forward

- Provided list of the 53 users to Susan Waters for follow up
- Requested database upgrade to generate a current report of user sign off

# ISM Review Findings & Recommendations



## INTEGRATED SAFETY MANAGEMENT & SAFETY CULTURE REVIEW MATERIAL SCIENCES DIVISION



# Key Issues



**Table 1. Summary of Findings, Observations, and Strengths**

## **Findings**

- JHAs are not consistently recognized as a hazard assessment tool, which is the function that is intended.
- AHDs are inconsistently updated, which impacts the integrity of work authorization.
- In practice, MSD appears to have a consistent methodology for informally assigning safety responsibilities that aligns with the science mission; however, this informal framework is not reflected in formalized expectations.

## **Observations**

- The array of feedback and improvement activities do not appear to be integrated in a way that allows Division management a clear sense of the effectiveness to which key risks are being managed.
- There are examples of unrecognized hazards related to the use of certain equipment.
- Uneven delivery of EHSD service and usability of tools have a negative impact on the MSD work and the partnering of researchers with EHSD.
- The culture of open reporting has been negatively impacted by response to recent events.

## **Strengths**

- MSD ESH core team is universally viewed as proactive and highly responsive.
- Group Safety Leads are a valuable part of the safety team.
- Personnel demonstrate a high degree of awareness of safety accountability and a strong ownership for the safety of their group.
- Mentoring process is generally robust and widespread.
- The MSD research groups have established and implemented processes to supplement the JHAs particularly in the area in risk assessment.



# Recommendations



1. **Improve methods of evaluating safety performance**  
Management needs to be more involved in analyzing safety metrics  
Conduct performance-based reviews using Pls and senior management as peers
2. **Reinvigorate the Near Miss Program that was negatively impacted by recent actions from Washington**
3. **Formalize safety roles of people in labs who have safety responsibilities**
4. **Make sure that safety activities are recognized as positive during performance appraisals and personnel reviews**
5. **Improve JHA utilization**  
Get everyone to sign AHDs (63% non compliance)  
Consider hazards of samples brought into shared labs  
Improve work descriptions
6. **Improve delivery of services from EH&S Division**

# Safety Culture Survey: LBNL



## DuPont Safety Perception Survey

Survey: **University of California - Lawrence Berkeley National Lab 201**  
Survey Date: **18-Oct-10**  
Report: **Berkeley National Lab**

### Number of Respondents

Executives	25
Managers/Supervisors	400
Hourly Workers	433
Professionals	1,317
No Job Category Selected	1
Total	2,176

# Safety Culture Survey: LBNL



LBNL Score

## Scores for all of LBNL



Overall Relative Culture Strength is a proprietary score that includes all of the questions from the Safety Perception Survey. The Leadership, Structure, and Processes and Actions scores are based on questions in those categories.

“World Class”

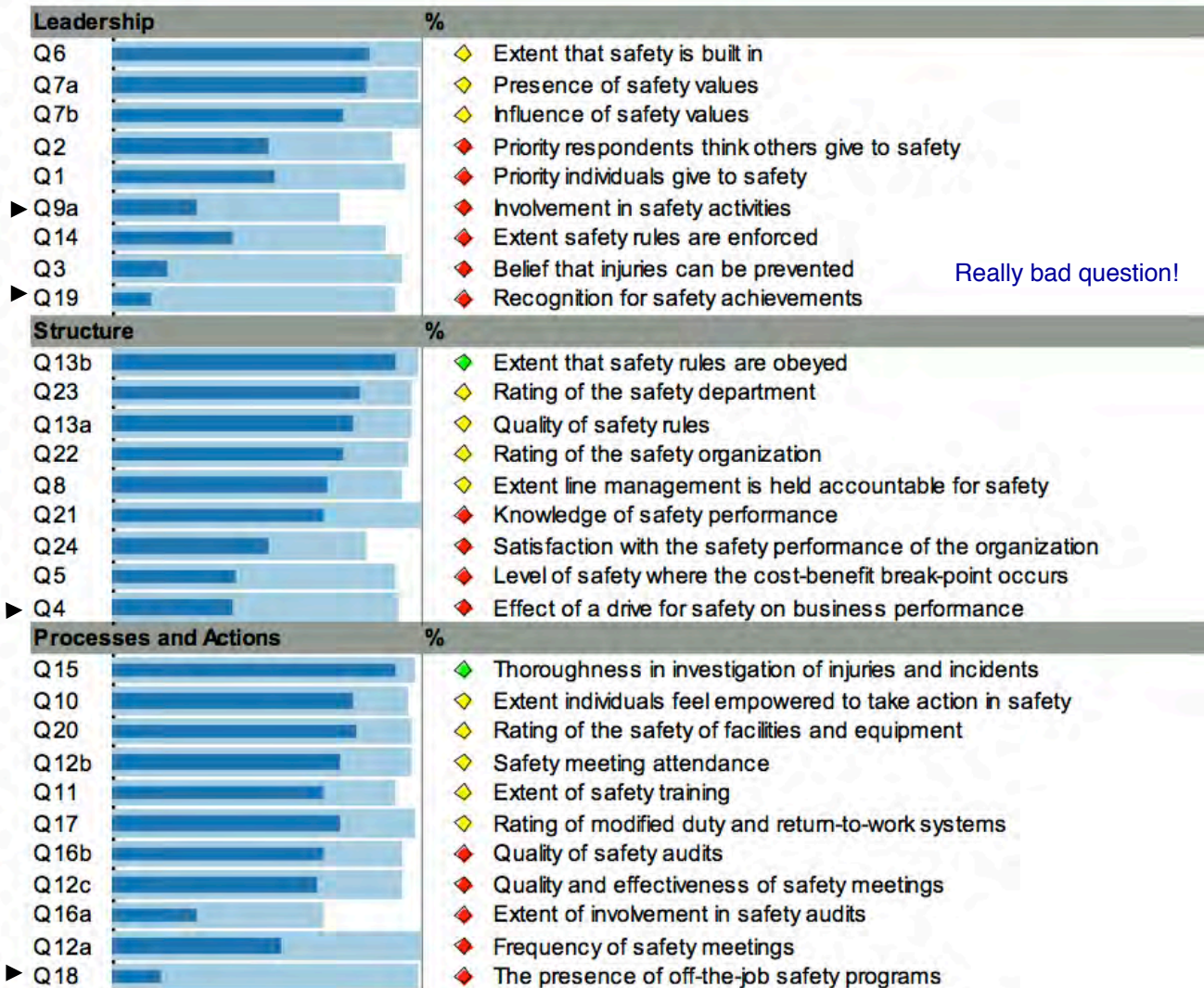
Best Score/Benchmark



# Safety Culture Survey: LBNL



## Overall Survey Results vs. Benchmark Best, sorted by strength

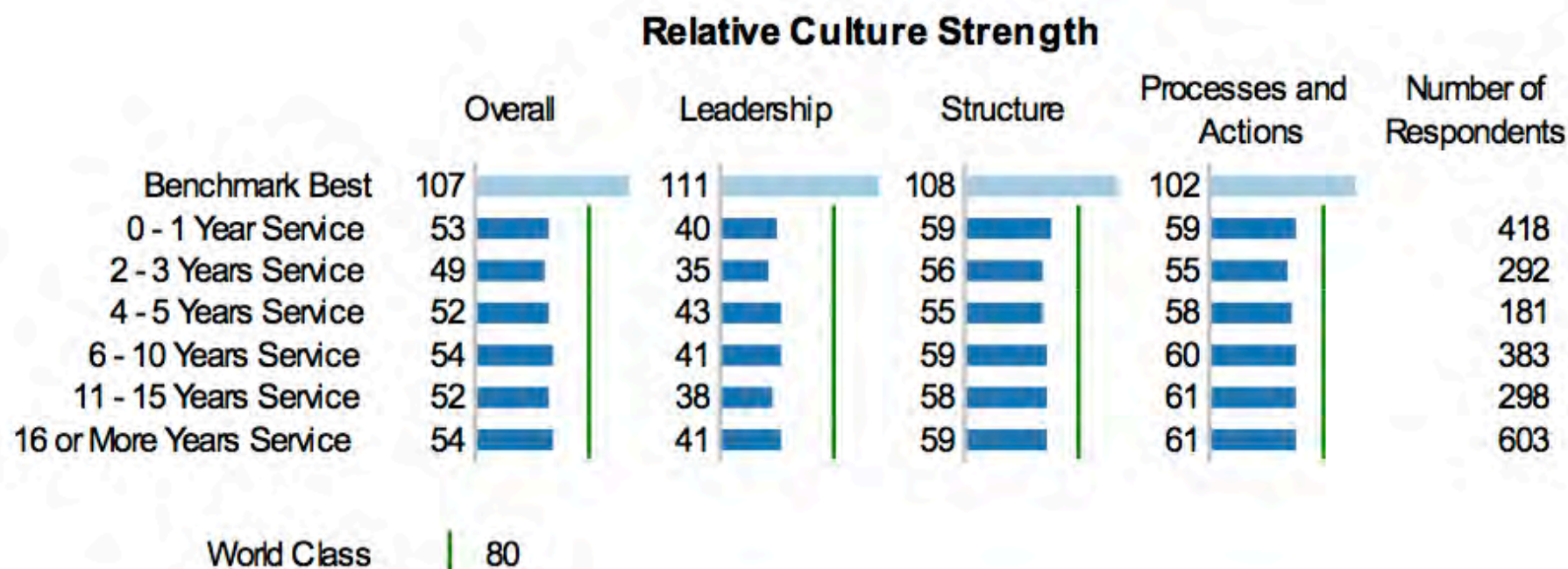


Notable low scores

Really bad question!

More on this one later

# Doesn't Change Across Years of Service at LBNL



# Substantial variation by Job Type



High Variation

Consensus

## Survey Results by Job Category

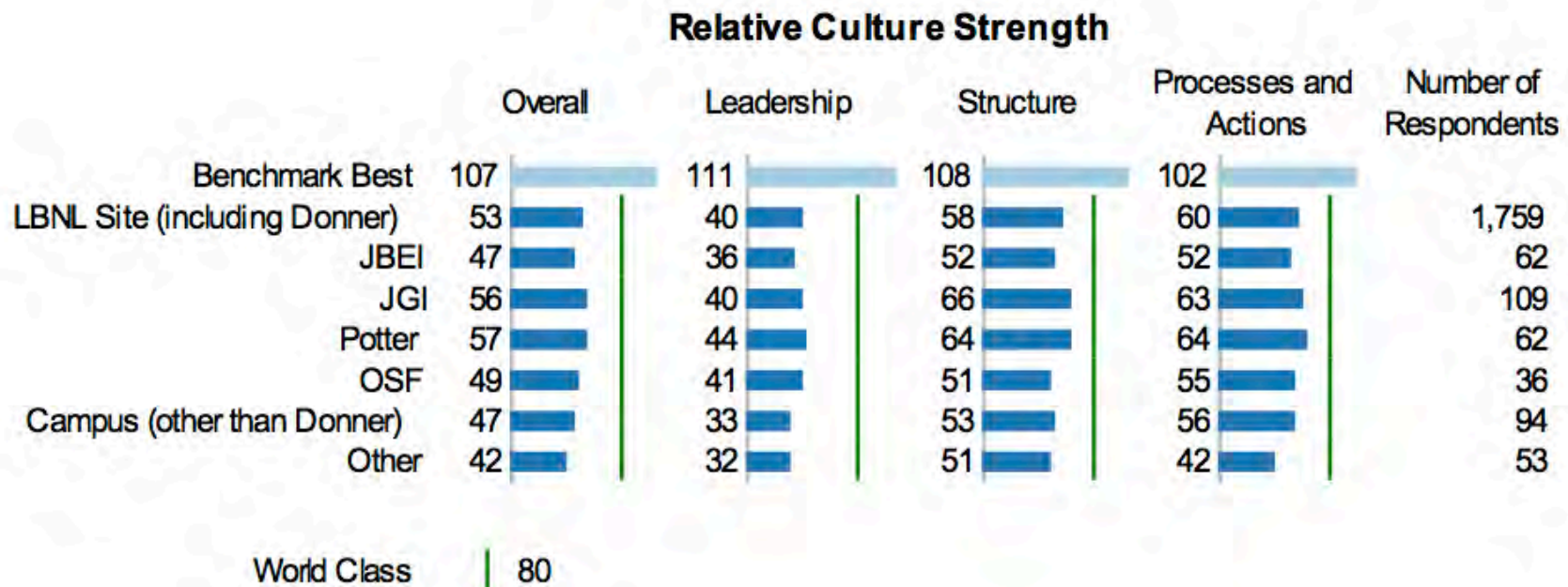
A: Executives B: Managers/Supervisors C: Hourly Workers D: Professionals

	A	B	C	D	Leadership
Q1	♦	♦	♦	♦	Priority individuals give to safety ◀
Q2	♦	♦	♦	♦	Priority respondents think others give to safety ◀
Q3	♦	♦	♦	♦	Belief that injuries can be prevented
Q6	♦	♦	♦	♦	Extent that safety is built in
Q7a	♦	♦	♦	♦	Presence of safety values
Q7b	♦	♦	♦	♦	Influence of safety values
▶ Q9a	♦	♦	♦	♦	Involvement in safety activities
Q14	♦	♦	♦	♦	Extent safety rules are enforced ◀
Q19	♦	♦	♦	♦	Recognition for safety achievements ◀
	A	B	C	D	Structure
Q4	♦	♦	♦	♦	Effect of a drive for safety on business performance ◀
Q5	♦	♦	♦	♦	Level of safety where the cost-benefit break-point occurs
Q8	♦	♦	♦	♦	Extent line management is held accountable for safety
Q13a	♦	♦	♦	♦	Quality of safety rules
Q13b	♦	♦	♦	♦	Extent that safety rules are obeyed ◀
Q21	♦	♦	♦	♦	Knowledge of safety performance
Q22	♦	♦	♦	♦	Rating of the safety organization
Q23	♦	♦	♦	♦	Rating of the safety department
Q24	♦	♦	♦	♦	Satisfaction with the safety performance of the organization ◀
	A	B	C	D	Processes and Actions
▶ Q10	♦	♦	♦	♦	Extent individuals feel empowered to take action in safety
Q11	♦	♦	♦	♦	Extent of safety training
▶ Q12a	♦	♦	♦	♦	Frequency of safety meetings
▶ Q12b	♦	♦	♦	♦	Safety meeting attendance
Q12c	♦	♦	♦	♦	Quality and effectiveness of safety meetings
Q15	♦	♦	♦	♦	Thoroughness in investigation of injuries and incidents
▶ Q16a	♦	♦	♦	♦	Extent of involvement in safety audits
Q16b	♦	♦	♦	♦	Quality of safety audits
Q17	♦	♦	♦	♦	Rating of modified duty and return-to-work systems
Q18	♦	♦	♦	♦	The presence of off-the-job safety programs
Q20	♦	♦	♦	♦	Rating of the safety of facilities and equipment

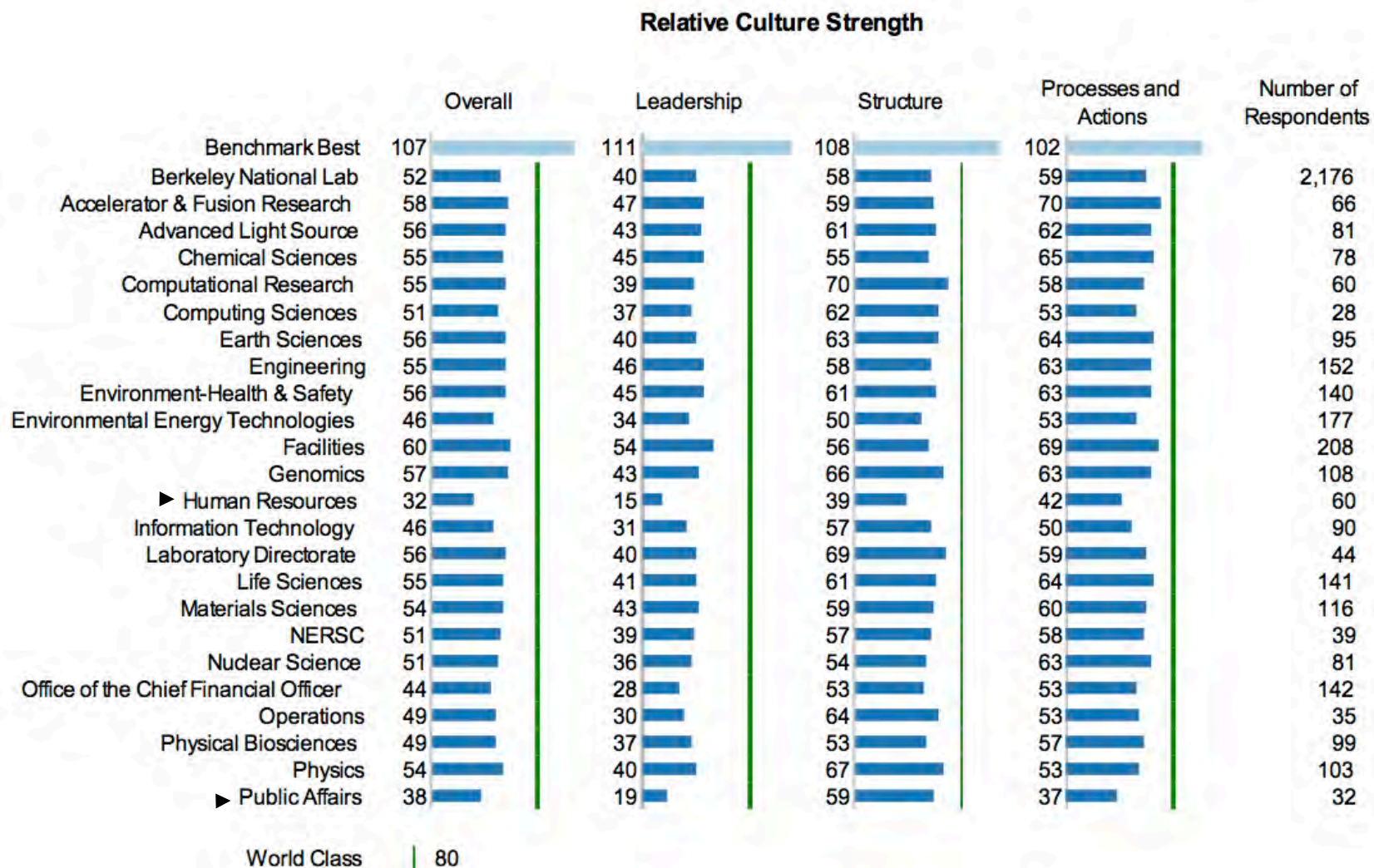
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# Slightly Site Dependent



# Some Variation by Division



# Variation by Job Within MSD



High Variation

	A: Executives	B: Managers/Supervisors	C: Hourly Workers	D: Professionals		Consensus
	A	B	C	D	Leadership	
Q1	*	●	●	●	Priority individuals give to safety	◀
Q2	*	●	●	●	Priority respondents think others give to safety	◀
Q3	*	●	●	●	Belief that injuries can be prevented	
Q6	*	○	○	○	Extent that safety is built in	
Q7a	*	●	○	○	Presence of safety values	
Q7b	*	●	●	●	Influence of safety values	
Q9a	*	●	●	○	Involvement in safety activities	
Q14	*	●	●	●	Extent safety rules are enforced	◀
Q19	*	●	●	●	Recognition for safety achievements	◀
	A	B	C	D	Structure	
Q4	*	●	●	●	Effect of a drive for safety on business performance	◀
Q5	*	●	●	●	Level of safety where the cost-benefit break-point occurs	
Q8	*	●	●	●	Extent line management is held accountable for safety	
Q13a	*	○	●	●	Quality of safety rules	
Q13b	*	○	○	○	Extent that safety rules are obeyed	
Q21	*	●	●	●	Knowledge of safety performance	
Q22	*	○	●	●	Rating of the safety organization	
Q23	*	○	●	○	Rating of the safety department	
Q24	*	●	●	●	Satisfaction with the safety performance of the organization	
	A	B	C	D	Processes and Actions	
Q10	*	○	●	●	Extent individuals feel empowered to take action in safety	
Q11	*	○	●	●	Extent of safety training	
Q12a	*	●	●	●	Frequency of safety meetings	
Q12b	*	○	●	●	Safety meeting attendance	
Q12c	*	●	●	●	Quality and effectiveness of safety meetings	◀
Q15	*	○	○	○	Thoroughness in investigation of injuries and incidents	◀
Q16a	*	●	●	●	Extent of involvement in safety audits	◀
Q16b	*	●	●	●	Quality of safety audits	
Q17	*	●	●	●	Rating of modified duty and return-to-work systems	
Q18	*	●	●	●	The presence of off-the-job safety programs	
Q20	*	○	●	●	Rating of the safety of facilities and equipment	

Looks really bad, but...

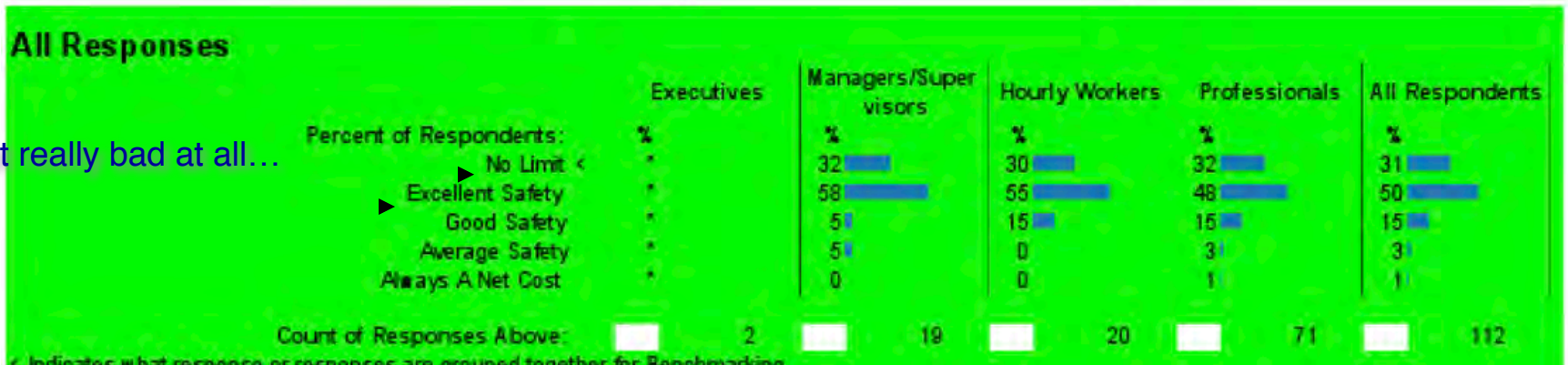
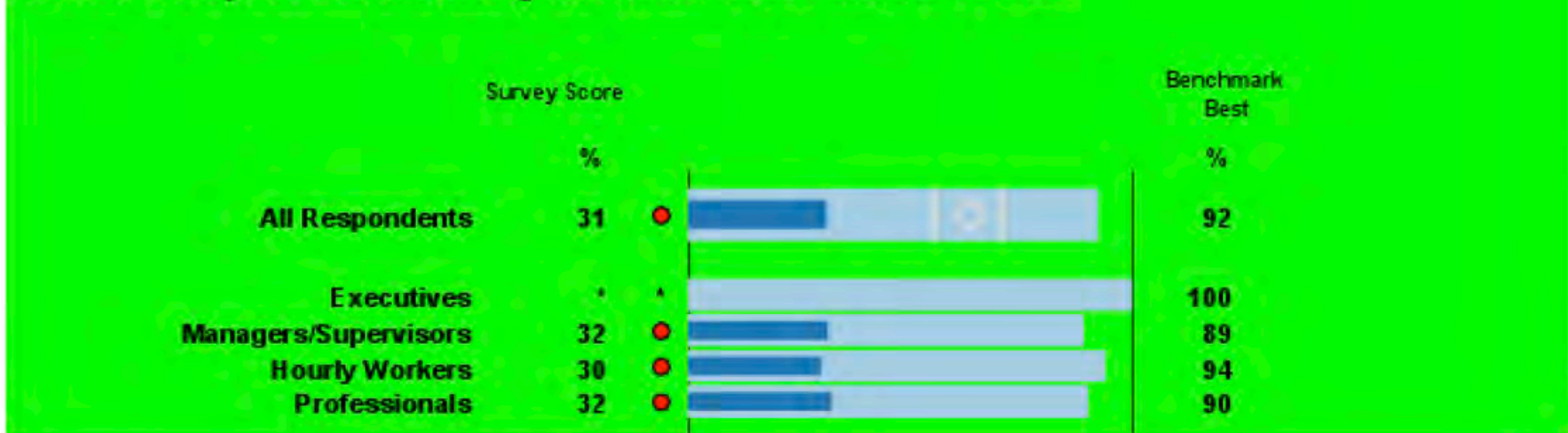


# Maybe not as Bleak as it Appears...



**Question 5: At what point does safety improvement cost more than the economic benefits it provides? (Possible economic benefits of safety are reduced costs of injuries and lost working time, better morale and product quality, improved production, etc.)**

Percent of respondents answering that within reason there is no limit: *Passing criterion is extreme...*



*Not really bad at all...*

# MSD Tracks with LBNL



## Survey Comparison: Leadership





# MSD Tracks with LBNL



## Survey Comparison: Structure



# MSD Tracks with LBNL



## Survey Comparison: Processes and Actions





# Discussion